

Remarks

The following comments are provided in support of the claims presented.

**1. Objections to the Drawings**

The Office has objected to the drawings under 37 CFR 1.83(a) for not showing the polygon shape of the annulus material recited in the claims.

Applicants submit herewith under cover of a letter to the Official Draftsperson a new Figure 2 which shows the polygon shape of the annulus material of the deflection element 102. This new drawing contains no new matter. Support for the drawing can be found in originally-submitted Claims 3 and 5. Applicants respectfully request entry of this new drawing which overcomes the objections to the drawings.

Applicants have submitted herewith amendments to the specification to provide a description for newly submitted Figure 2 in the Brief Description of the Drawings on page 7 and also to briefly describe the high-compliance deflection element having the shape of a regular polygon in the paragraph beginning at the bottom of page 9. These amendments to the specification add no new matter.

**2. Objections to the Specification**

The Office has objected to the Abstract because it contains less than 50 words.

Applicants submit herewith an amendment to the specification to increase the length of the Abstract to more than 50 words. This amendment contains no new matter.

**3. § 112 Rejections**

Claims 1-14 have been rejected under 35 U.S.C. § 112, first paragraph as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention.

Applicants have herein amended Claims 1 and 7-9 to delete reference to “a displacement gauge” and instead substitute therefore “at least one distance scale.”

Support for these amendments to Claim 1 and 7-9 can be found in the last paragraph on page 8 and in the second paragraph on page 9.

Applicants respectfully submit that the amendments presented herein to Claims 1 and 7-9, which add no new matter, are sufficient to overcome the § 112 rejection of Claims 1-14.

#### **4. § 103 Rejections**

Claims 1-14 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Lewis (US 5,583,290) in view of Que et al (US 6,377,718).

As amended herein, Claim 1 requires “at least one distance scale” instead of a “displacement gauge” as originally recited in Claim 1. The Office states on page 4 of paper no. 7 that Lewis does not disclose a “gauge” which Applicants understand to mean that Lewis does not disclose a “distance scale for optically measuring a deflection” as recited in amended Claim 1. The Office further states on page 4 of paper no. 7 that Lewis does not disclose a “force coupler” as required by Applicants’ Claim 1.

The Office then cites Que et al on page 4 of paper no. 7 for disclosure of a gauge 165 and a force coupler 162 in figs. 11 and 20 and as described in col. 12, lines 14-25. Applicants respectfully submit that the “force coupler 162” cited by the Office in Que et al is not a force coupler at all, but instead is clearly referred to by Que et al as a “directional coupler” for light (see fig. 20 and col. 12, lines 14-19). In this passage, Que et al state:

As illustrated in FIG. 20, a source 160 may direct the input light on a fiber 161 to a directional coupler 162 which transmits the input light on the fiber 61.

The reflected light that passes into the fiber 61 is passed back to the directional coupler 162 and is directed to an optical fiber 164 to a detector 165.

From this passage cited from Que et al, it is clear that the directional coupler 162 operates with light rather than with force and has nothing to do with force at all. Furthermore, the directional coupler 162 is incapable of transferring any force since

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there is no physical connection between the directional coupler 162 and any element that is moveable (see fig. 20) including gate 69. Therefore, Applicants respectfully submit that the Office has not shown that either Lewis or Que et al teach or suggest Applicants' essential claim limitation of "a force coupler" recited in Claim 1 so that the Office has not made a valid *prima facie* case of obviousness for the § 103 rejection of Claims 1-14. Therefore, Claims 1-14 are allowable.

Additionally, Que et al does not disclose a "distance scale" as required by amended Claim 1. The Office as noted above cites Que et al for disclosure of "a gauge 165." Applicants respectfully traverse this statement by the Office since Que et al mentions nothing of "a gauge 165" but instead refers to a "detector 165" (see fig. 20 and col. 12, line 19-25). The "detector 165" in Que et al, which detects light that has been transmitted through an optical fiber 164, cannot be considered to be "a distance scale" as required by independent Claim 1. Applicants' "distance scale" is disclosed as being a mechanical scale which includes a plurality of markings to indicate distance (see elements 105, 106 and 109 in Fig. 1c). Therefore, Applicants respectfully submit that, since the Office has not shown in the art of record the essential claim limitation of a "distance scale" as required by independent Claim 1, the Office has not made a valid *prima facie* case of obviousness for Claims 1-14 based on the combination of Lewis and Que et al.

Furthermore, one skilled in the art would not be motivated to provide the optical elements of Que et al including the directional coupler 162 and detector 165 into the device of Lewis as suggested by the Office since there is no reason to do so. The device of Lewis is fully functional as it is and utilizes capacitance sensing technology to measure acceleration (see col. 1, lines 22-34). Thus, one skilled in the art would not be motivated to utilize the optical sensing technology of Que et al into the device of Lewis et al which is already fully functional and which utilizes capacitive sensing technology for acceleration movement. The capacitive sensing technology also provides an important added benefit of being usable in a force balance loop to control deflection of the moveable element within maximum

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deflection limits and prevent contact between the moveable element and the stationary element (see col. 2, lines 25-46 and claim 1) which would be defeated if the optical sensing technology of Que et al were to be substituted for the capacitive sensing technology already present in Lewis. For these reasons, Applicants respectfully submit that the Office has not shown the motivation that would lead one skilled in the art to combine the teachings of Que et al with Lewis to form Applicants' claimed invention.

With regard to Claims 3-6, these claims recite "an annulus of material" which either has the shape of "a polygon" or is "circular." The Office cites element 12 in Lewis for an annulus of material. Applicants respectfully traverse this as being totally unsupported by Lewis. The word "annulus" is defined in *Webster's New Collegiate Dictionary* (G. & C. Merriam Co., Springfield, MA, 1976) as being a "ring" or "a part, structure, or marking resembling a ring." Element 12 in figs. 1 and 2 of Lewis is clearly not a ring structure. Instead, element 12 is disclosed as being a "bridge" suspended above substrate 14 on posts 16 and having a plurality of fingers 20 extending outward therefrom (see figs. 1 and 2; and col. 2, lines 52-59). Furthermore, element 12 does not have the shape of a polygon and is not circular. Perhaps the Office has viewed element 12 in combination with posts 16 and substrate 14 to arrive at the rejection of Claims 3, 5 and 6. However, this is not proper since element 12 standing alone must have an annular structure, which it clearly does not. Therefore, Applicants urge that the Office has not made a valid *prima facie* case for the obviousness of Claims 3-6 so that these claims are allowable.

With regard to Claims 7 and 8, which have been amended herein, the Office cites elements 61 and 64 in Que et al for the "indicators" recited in these claims. Elements 61 and 64 are disclosed by Que et al as being "input optical waveguide 61" and "output optical waveguide 64" (see col. 7, lines 56 and 61). Applicants respectfully submit that "input optical waveguide 61" and "output optical waveguide 64" only act to transmit light and are not indicators of anything. Furthermore, the Office states that "indicators 61, 64 are mechanically coupled to displacement means

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69.” Applicants respectfully traverse this statement as being unsupported by Que et al since figs. 11, 14 and 20 do not show any mechanical coupling at all between elements 61, 64 and moveable element 69; and such mechanical coupling would not be possible due to intervening silicon plates 63 and 66 and air gaps (see figs. 11 and 14 and col. 7, lines 53-63). Therefore, Applicants respectfully submit that the Office has not made a valid *prima facie* case for the obviousness of Claims 7 and 8 since the essential claim limitation of an “indicator which is mechanically coupled to the a displacement of the high-compliance deflection element” is not found in or suggested by the art of record. Therefore, Claims 7 and 8 are allowable.

With regard to Claim 9, the Office cites as motivation for combining Lewis and Que et al for the purpose of “monitoring beam profiles” as disclosed in Que et al. Applicants respectfully submit that this motivation would not lead one skilled in the art to form Applicants’ invention as recited in Claim 9 since Que et al in referring to “monitoring beam profiles” refers to beams of light (see col. 7, line 33); whereas Applicants’ claimed invention is directed a dynamometer which measures the force exerted upon a ring structure (i.e. an annular beam of a mechanical material) in order to measure deformation of the ring structure and thereby determine absolute fundamental material and mechanical properties. Thus, “monitoring beam profiles” for light beams would not motivate one skilled in the art to form Applicants’ dynamometer as recited in Claim 9 since Claim 9 has nothing at all to do with “monitoring beam profiles” for light beams. Therefore, Applicants urge that since the Office has not shown the requisite motivation for one skilled in the art to form Applicants’ invention of Claim 9 based on the combination of Lewis and Que et al, the Office has not made a valid *prima facie* case for the obviousness of Claim 9.

With regard to Claim 10, the Office cites Lewis for “a calibration force input” as recited in this claim. Applicants respectfully submit that dependent Claim 10 includes each and every element of independent Claim 1, and that Claim 10 must be considered as a whole. One skilled in the art would understand that the “calibration force input” recited in Claim 10 must be provided to “the force coupler transferring

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force from an external source to the at least one input site” as recited in Claim 1. This is also disclosed at the in the last sentence on page 8 of Applicants’ specification. Thus, Claim 10 requires the “calibration force input” to be generated externally to the device and to be provided to the dynamometer through the force coupler. In Lewis, any force generated is produced internally to the device (i.e. through capacitors 102 and 104) which is contrary to the requirement of Claim 10 for an external source for the calibration force input. The Office has also stated on page 4 of paper no. 7 that Lewis “does not disclose a force coupler transferring force from an external source to the input site” so that any force in Lewis et al cannot be coupled through a force coupler as required for Claim 10. Therefore, Applicants respectfully submit that the Office has not made a valid *prima facie* case of obviousness for the rejection of Claim 10.

With regard to Claims 12-14, these claims recite the essential claim limitations of “a deflection restraint system” which comprises “motion guides” or “ring constraints.” The Office recognizes that such elements are absent from Lewis and seeks to provide them from Que et al. The Office further cites as guides elements 61 and 64. Applicants respectfully submit that elements 61 and 64 are cited by Que et al as being “waveguides” (see col. 8, lines 58-61) for guiding light and not “motion guides” as recited in Claim 13. In fig. 12 of Que et al cited by the Office, the “waveguides” 61 and 64 do not restrain motion of any moveable member as required by Applicants’ “deflection element restraint system”, but instead serve to guide light into and out of the device of Que et al. In fig. 12 of Que et al, the only moveable element is gate 69 (see also fig. 11) which is not restrained in any way by waveguides 61 and 64 due to the presence of intervening elements 63 and 66. Furthermore, “utilizing a clamp mechanism to mountably hold the [wave]guides in place” as suggested by the Office in no way restrains deflection of gate 69 due to the presence of intervening elements 63 and 66.

The Office also has not shown where in the art of record is found the essential claim limitation of “ring constraints” in Claim 14. Nowhere does Lewis or Que et al

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disclose any ring structure for which "ring constraints" could be used. For the above reasons, Applicants respectfully submit that the Office has not made a valid *prima facie* case of obviousness for the rejection of Claims 12-14 so that these claims must be allowable.

Conclusion

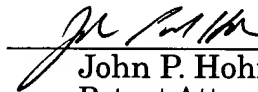
Applicants have responded to each and every rejection and objection, and urge that the Application is in condition for allowance or appeal. A favorable reconsideration is earnestly solicited.

Respectfully submitted,

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☒ 37 CFR 1.8(a)

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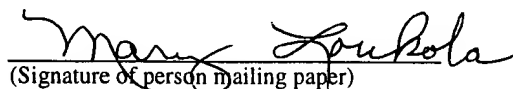
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